Chapter 4
Development of an Initial HEMP

4-1. General

A typical strategy would first include a preliminary assessment identifying the problems and issues described in both this chapter and in Chapter 3. This assessment would result in the preparation of an initial hydrologic engineering management plan, sufficient to scope time and funding requirements. The initial HEMP would include appropriate contingencies to establish total hydrologic engineering cost for inclusion in the initial project management plan or in the PMP. If time and funds are available at the end of the reconnaissance phase, a detailed HEMP could be prepared in lieu of the initial plan. A senior hydrologic engineer could develop the initial hydrologic engineering management plan, while the responsible engineer could expand this document into a detailed HEMP. The activities in Chapters 3, 4, and 5 are summarized in Figure 3.

4-2. Field Inspection

An early field inspection is necessary to become familiar with site-specific problems that must be incorporated in the HEMP. A continuous field presence should be maintained throughout the study to keep pace with changes to the study area. Field inspection would focus on any features causing analysis problems, ongoing changes in the study area, interviews with locals concerning past flood experiences or changes to the area since large past floods, contacting local agencies to obtain information on the area and on any plans for modifications that could affect the Corps analysis, and other items of interest.

4-3. Coordination

Various coordination and information needs must be addressed in the HEMP.

a. Study team needs. The various hydrologic information needs of the interdisciplinary planning team have been briefly described in Chapter 2, paragraph 2-3. Anticipated hydrologic information needs should be obtained from the study team during the reconnaissance process for inclusion in time and cost estimates and schedule for the feasibility phase.

b. Sponsor needs.

(1) The sponsor usually has valuable information about the study area. The sponsor may have some capability for obtaining necessary information pertinent to the project or for performing some of the hydrologic engineering necessary for the study, which could be a credit to the sponsor. The cost-sharing partner normally has specific views on the type of alternatives believed most suitable for the study area. All of these possibilities would be reflected in the HEMP.

(2) An initial HEMP is useful in dealing with the local sponsor on necessary hydrologic engineering activities and in justifying the hydrologic engineering cost estimate, which the sponsor must cost-share. Discussing the necessary hydrologic activities, summarized in a HEMP, with the sponsor is more likely to result in agreement on the effort involved than to simply present the sponsor with a total cost.

c. Feasibility cost-sharing agreement. The FCSA cannot be negotiated adequately without having the hydrologic engineering work defined in sufficient detail. The hydrologic engineer must be involved in any negotiations concerning hydrologic engineering, or in hydrologic engineering work that the sponsor might perform for the project. The hydrologic engineer must approve the technical value of the sponsor's work before it can be accepted as a sponsor credit.

4-4. Collecting Information

The hydrologic engineer must evaluate the available data, as well as estimate what additional data are necessary for conducting the study. Actual climatologic, hydrologic, hydraulic, sediment, water quality and infrastructure data available would be determined, sources and quality of such data evaluated, and any special needs for a limited data collection program determined. Topographic information necessary to develop accurate water surface profile information will be estimated.

4-5. Basic Analysis Approaches

The analysis approach must be based on the hydrologic information needs of the study team, unusual features of the study, the type of alternatives requiring investigation, the significance of the alternatives on the sediment

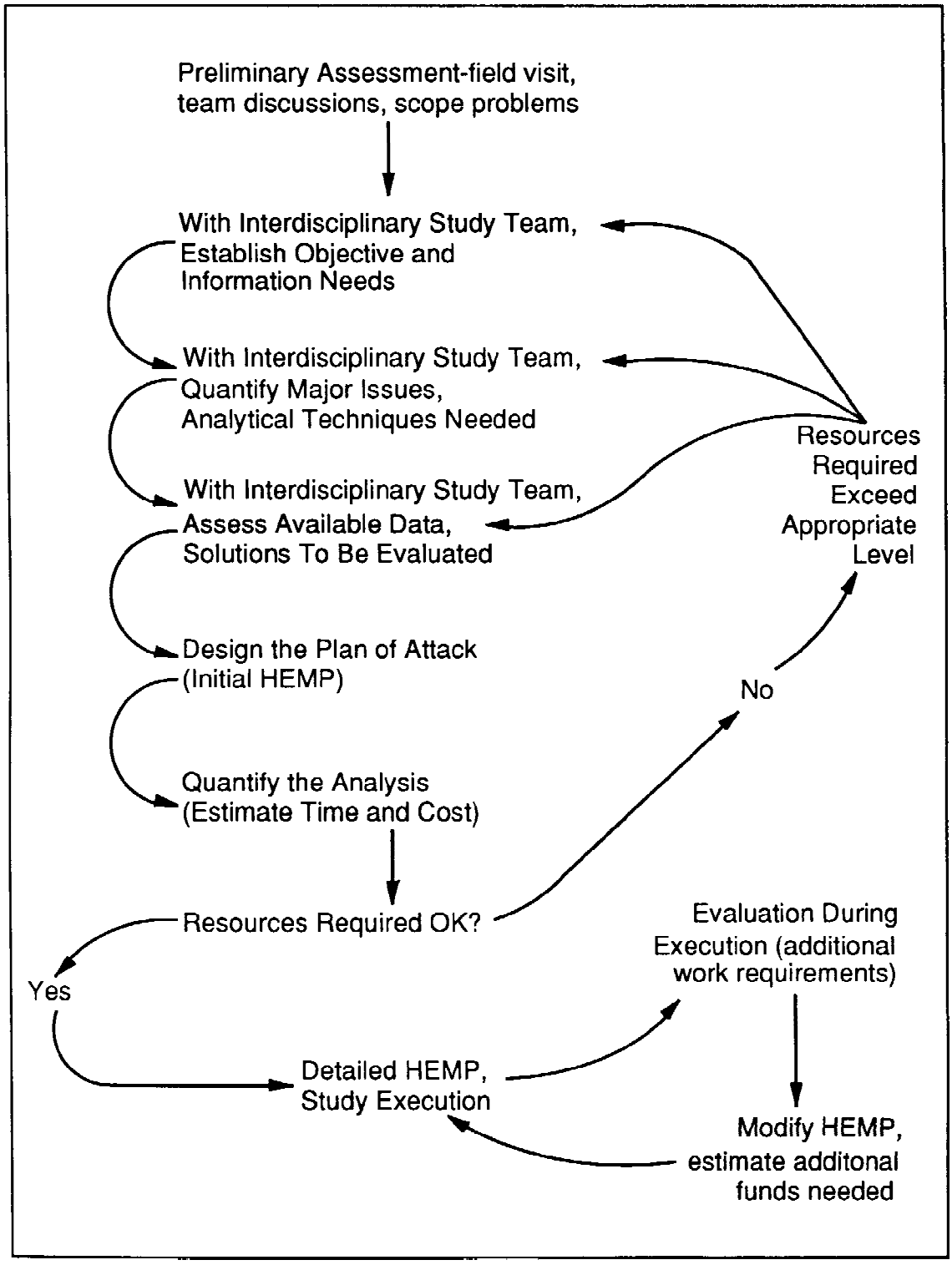

Figure 3. Hydrologic study design

regime, and other considerations. Selection of the appropriate hydrologic model, a single event or a continuous model, steady or unsteady flow procedures, and qualitative or quantitative sediment analysis must depend on the judgment and skills of the responsible hydrologic engineer. Models and procedures should be selected based on the reduction of uncertainty in the end product. If a sophisticated model or procedure does not give a significantly improved result and reduced uncertainty, a less sophisticated method is probably appropriate. Selection of new models or procedures could include an allowance for assistance by the (HEC), the U.S. Army Engineer Waterways Experiment Station (WES), or other consultants. New models and innovative, unusual procedures should be approved by higher authority at the technical review conference held at the end of the reconnaissance phase, or earlier. Peer review by the appropriate HQUSACE-sponsored committee should also be considered for unusual or complex analyses.

4-6. Initial HEMP Preparation

Using information from the preliminary assessment, identify the major activities, including alternatives to be analyzed and the range of sizes to study. The initial HEMP would be used to estimate human resource requirements for each activity to establish a total hydrologic engineering study cost. An example of an initial HEMP for a flood control study is presented in Appendix C.

4-7. Time and Schedule Estimates

With the initial HEMP, determine the human resources required for each major technical hydrologic engineering study component (rainfall analyses, water surface profile, channel modifications, etc.) and for the complete hydrologic engineering effort. Estimate the human resources necessary for each discipline (hydrologic engineer, technician, supervisor, etc.). Estimate when necessary information must be furnished to (or received from) other study team members. Clearly indicate the number of alternatives to be evaluated and the number of sizes to analyze for each alternative. Determine if special training is necessary for the responsible engineer to effectively perform the study. Include any other factors having a significant impact on required time for the hydrologic engineering analysis, along with any assumptions on which the estimate is based. Include a reasonable contingency allowance.

4-8. Funding Estimates

Determine the chargeable rate for each technical discipline used in the hydrologic work. Include all direct and indirect overhead charges for the division to which hydrologic engineering is assigned and for the District. At the time of publication of this EP, the chargeable rate for District personnel averaged about 2.8-3.0 times the base salary. For example, if an engineer earned $25/hour base wages, the project is charged $70-75/hour for each hour charged by the staff member. Total the funds for each major activity and for the total hydrologic engineering effort. Forward the estimate to the planning technical manager for approval of hydrologic time and costs.

4-9. Resource Evaluation/Negotiation

a. Through an iterative process, come to agreement with all concerned on study objectives, analysis approaches, alternatives to be analyzed, sizes to study, and level of detail obtainable with funding constraints. Prepare written documentation on this agreement and include any problems, difficulties, or lack of engineering detail that may result from this reduced effort. Finalize these activities in the HEMP for inclusion in the initial project management plan, or PMP. Reference these changes and agreements in the hydrologic engineering management plan, or in separate documentation.

b. The IPMP is reviewed and approved by the chief of each technical division. The signature of the Chief of the Engineering Division (the division to which hydrologic engineering is normally assigned) on the IPMP indicates that the hydrologic engineer agrees to perform these activities for the funding specified. The responsibility then falls on the hydrologic engineer to ensure that the actual time and costs are commensurate with the agreed amount. Additional hydrologic work required by the interdisciplinary planning study team or sponsor during the feasibility or design phase must result in additional resources being made available by the project or study manager.